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EXAMINER

FREDMAN, JEFFREY NORMAN

ART UNIT PAPER NUMBER

1637

DATE MAILED: 04/22/2002

10

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/724,755

Applicant(s)

WENZ, HANS-MICHAEL

Examiner

Jeffrey Fredman

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 14 March 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 52-86 and 115-129 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 52-86 and 115-129 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 9.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Election/Restrictions***

1. Applicant's election without traverse of Group II in Paper No. 6 is acknowledged.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

3. Claims 52-64, 69-80, 85, 86 and 115-117 are rejected under 35 U.S.C. 102(b) as being anticipated by Barany et al (WO 97/31256).

Barany teaches a kit (page 88, claim 138) comprising

- (a) a plurality of oligonucleotide probe sets wherein each probe set has a different target sequence (page 12, lines 10-34) and comprises

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(i) a first probe with a target specific portion and a addressable array specific portion, where the 5' terminal nucleotides of the addressable array portion can inherently function as a 5' primer specific portion and

(ii) a second probe comprising a target specific portion and a 3' addressable , where the terminal nucleotides of the addressable array portion can inherently function as a primer specific portion,

wherein the oligonucleotides in the set are suitable for ligation together when hybridized to each other adjacent to one another on a complementary target sequence

(b) and where one of the oligonucleotides has a detectable reporter label  
(page 88, claim 138)

(c) and a solid support with capture oligonucleotides complementary to the addressable array specific portions,

(d) and a thermostable ligase such as Tth ligase (page 88, claim 138 and claim 143).

(e) and a thermostable polymerase such as Taq polymerase (page 15, line 24 and page 89, claim 144).

Barany further teaches the use of fluorescent labels (page 25, lines 9-14) as well as the use of phosphorothioate nucleotides (page 14, lines 12-20 and page 13, lines 35-38). The examiner notes that one embodiment of the Barany kit would involve the entire probe being composed of phosphorothioates (see page 13, lines 35-38 and page 14, lines 12-20).

Barany teaches that the full length capture probe is attached to the solid support at the 5' end by a 5' amino modification which capture probes can inherently also function as primers for amplification (page 52, lines 9-11 and page 36, lines 14-20).

With regard to the orientation of the primer region and addressable region, it is noted that in an oligonucleotide, these terms represent intended use limitations and do not structurally effect the oligonucleotide. That is, for example, the following oligonucleotide:

5' – ACGTACGTGGTGGTGGTGGTAACAACAACAAC – 3'

is structurally identical, that is exactly the same, irrespective of whether the oligonucleotide has the INTENDED properties in a METHOD as below:

5' – ACGTACGT	GGTGGTGGTGGT	AACAACAACAAC
Addressable region	primer region	target specific region

Or if the oligonucleotide has the INTENDED properties in a METHOD as below:

5' – ACGTACGT	GGTGGTGGTGGT	AACAACAACAAC
primer region	addressable region	target specific region

Or even if the oligonucleotide has the INTENDED properties in a METHOD as below:

5' – ACGTACGTGGTGGTGGTGGT	AACAACAACAAC
addressable region	target specific region

The ultimate sequence of this oligonucleotide will still be

5' – ACGTACGTGGTGGTGGTGGTAACAACAACAAC – 3' in each of the three situations above. Further, any region of any oligonucleotide is inherently and necessarily capable of function as a primer target region, or as an addressable region

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or as a target specific region, which specificity is solely dependent upon experimental selection of the appropriate primer, capture probe or target.

4. Claims 52-63, 69-79, 85, 86, 115-117 and 120-129 are rejected under 35 U.S.C. 102 (a) and (e) as being anticipated by Barany et al (U.S. Patent 6,027,889).

Barany teaches the use of kits (column 49, line 41) and teaches methods using products comprising

(a) a plurality of oligonucleotide probe sets (column 23, lines 20-33) wherein each probe set has a different target sequence (column 23, lines 20-33 and column 26, line 37 to column 27, line 19) and comprises

(i) a first probe with a target specific portion and a addressable array specific portion, where there is an addressable array portion function and a region which functions as a primer specific portion and

(ii) a second probe comprising a target specific portion and a 3' addressable , where there is an addressable array portion function and a region which functions as a primer specific portion (column 23, lines 20-33 and column 26, line 37 to column 27, line 19),,

wherein the oligonucleotides in the set are suitable for ligation together when hybridized to each other adjacent to one another on a complementary target sequence (column 23, lines 34-53)

(b) and the use of primers which amplify a primer specific portion of the oligonucleotides (column 23, lines 54-63),

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(c) and where one of the oligonucleotides has a detectable reporter label (column 23, line 60) ,

(d) and a solid support with capture oligonucleotides complementary to the addressable array specific portions (column 27, lines 10-19),

(e) and a thermostable ligase such as Tth ligase (column 33, lines 52-67) ,

(f) and a thermostable polymerase such as Taq (see figure 9, for example).

Barany further teaches the use of fluorescent labels (column 3, lines 28-30).

With regard to the orientation of the primer region and addressable region, it is noted that in an oligonucleotide, these terms represent intended use limitations and do not structurally effect the oligonucleotide. That is, for example, the following oligonucleotide:

5' – ACGTACGTGGTGGTGGTGGTAACAACAACAAC – 3'

is structurally identical, that is exactly the same, irrespective of whether the oligonucleotide has the INTENDED properties in a METHOD as below:

5' – ACGTACGT	GGTGGTGGTGGT	AACAACAACAAC
Addressable region	primer region	target specific region

Or if the oligonucleotide has the INTENDED properties in a METHOD as below:

5' – ACGTACGT	GGTGGTGGTGGT	AACAACAACAAC
primer region	addressable region	target specific region

Or even if the oligonucleotide has the INTENDED properties in a METHOD as below:

5' – ACGTACGTGGTGGTGGTGGT	AACAACAACAAC
addressable region	target specific region

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The ultimate sequence of this oligonucleotide will still be

5' – ACGTACGTGGTGGTGGTGGTAACAACAAC – 3' in each of the three situations above. Further, any region of any oligonucleotide is inherently and necessarily capable of function as a primer target region, or as an addressable region or as a target specific region, which specificity is solely dependent upon experimental selection of the appropriate primer, capture probe or target.

Barany expressly teaches sets of six probes with identical sequences at the 5' end (see column 51, lines 25-29). Barany expressly teaches the use of sets of probes (see column 45, tables 6 and 7).

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 52-86 and 115-129 are rejected under 35 U.S.C. 103(a) as being unpatentable over either Barany et al (WO 97/31256) in view of Xu et al (Tetrahedron Lett. (1997) 38(32):5595-5598).

Barany teaches the limitations of claims 52-64, 69-80, 85, 86 and 115-117 as discussed above. Barany further suggests the use of common primers (see page 19, lines 2-3) as well as expressly teaching multiplexing as discussed above.

Barany does not teach the use of tosylated or iodate oligonucleotides for ligation

Xu teaches tosylated and iodate oligonucleotides for ligation (page 5595).



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It would have been *prima facie* obvious to one having ordinary skill in the art at the time the invention was made to combine the ligation kit of Barany with the use of iodate oligonucleotides since Xu states "This makes possible several practically useful template directed ligations, including the ligations of ssDNAs, cyclization of ssDNAs and ligation of sticky ended duplexes. This reactions proceed in good yield and without specialized protecting groups or deprotection conditions. The method further obviates the need for ligase enzyme, which is costly on a preparative scale (page 5598)". An ordinary practitioner would have been motivated to substitute the oligonucleotide of Xu into the method of Barany for the express motivation of efficient ligation in good yield without the expense of the ligase enzyme..

7. Claims 52-64, 69-80, 85, 86 and 115-117 and 120-129 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barany et al (WO 97/31256) in view of Boyce-Jacino (WO 99/66076).

This rejection (and the 103 rejection following this rejection) is made so that if this case is appealed, and the Board of Patent Appeals and Interferences determines that, contrary to the express teachings of all of the prior art from the original Mullis polymerase chain reaction patent in 1987 onward, it is not inherent in every oligonucleotide that there is a primer binding site, this 103 rejection expressly teaches this element.

Barany teaches a kit (page 88, claim 138) comprising

(a) a plurality of oligonucleotide probe sets wherein each probe set has a different target sequence (page 12, lines 10-34) and comprises

- (i) a first probe with a target specific portion and a addressable array specific portion, where the 5' terminal nucleotides of the addressable array portion can inherently function as a 5' primer specific portion and
- (ii) a second probe comprising a target specific portion and a 3' addressable , where the terminal nucleotides of the addressable array portion can inherently function as a primer specific portion,

wherein the oligonucleotides in the set are suitable for ligation together when hybridized to each other adjacent to one another on a complementary target sequence

(b) and where one of the oligonucleotides has a detectable reporter label  
(page 88, claim 138)

(c) and a solid support with capture oligonucleotides complementary to the addressable array specific portions,

(d) and a thermostable ligase such as Tth ligase (page 88, claim 138 and claim 143).

(e) and a thermostable polymerase such as Taq polymerase (page 15, line 24 and page 89, claim 144).

Barany further teaches the use of fluorescent labels (page 25, lines 9-14) as well as the use of phosphorothioate nucleotides (page 14, lines 12-20 and page 13, lines 35-38). The examiner notes that one embodiment of the Barany kit would involve the entire probe being composed of phosphorothioates (see page 13, lines 35-38 and page 14, lines 12-20).

Barany teaches that the full length capture probe is attached to the solid support at the 5' end by a 5' amino modification which capture probes can inherently also function as primers for amplification (page 52, lines 9-11 and page 36, lines 14-20).

Boyce-Jacino teaches an embodiments of probes which teaches that the addressable or capture region can be rearranged with the primer to form a primer, capture, target binding arrangement (see pages 13-18). Specifically, Boyce-Jacino states "In another preferred embodiment, the capture moiety comprises a specific sequence complementary to a PCR primer or portion thereof, used to amplify a region of the template strand.(page 16, lines 5-10).".

It would have been *prima facie* obvious to one having ordinary skill in the art at the time the invention was made to utilize the rearranged primer as taught by Boyce-Jacino in the method of Barany in order to permit amplification of the template strand within the primer in a PCR type reaction. An ordinary practitioner would have been motivated to modify the Barany primer to include a primer sequence within the capture moiety in order to permit amplification of the template strand and to permit nested amplification.

8. Claims 52-86 and 115-129 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barany et al (WO 97/31256) in view of Boyce-Jacino (WO 99/66076) and further in view of Xu et al (Tetrahedron Lett. (1997) 38(32):5595-5598).

Barany in view of Boyce-Jacino teaches the limitations of claims 52-64, 69-80, 85, 86 and 115-117 and 120-129 as discussed above.

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Barany in view of Boyce-Jacino does not teach the use of tosylated or iodate oligonucleotides for ligation.

Xu teaches tosylated and iodate oligonucleotides for ligation (page 5595).

It would have been *prima facie* obvious to one having ordinary skill in the art at the time the invention was made to combine the ligation kit of Barany with the use of iodate oligonucleotides since Xu states "This makes possible several practically useful template directed ligations, including the ligations of ssDNAs, cyclization of ssDNAs and ligation of sticky ended duplexes. This reactions proceed in good yield and without specialized protecting groups or deprotection conditions. The method further obviates the need for ligase enzyme, which is costly on a preparative scale (page 5598)". An ordinary practitioner would have been motivated to substitute the oligonucleotide of Xu into the method of Barany for the express motivation of efficient ligation in good yield without the expense of the ligase enzyme.

### ***Response to Arguments***

9. Applicant's arguments filed March 14, 2002 have been fully considered but they are not persuasive.

Applicant argues that Barany does not teach a probe set where the probes are suitable for ligation together. The only requirement for probes to be suitable for blunt end ligation is the presence of a phosphate at the 5' end of one probe and a hydroxyl at the 3' end of the other probe. The probes of Barany meet this requirement. In fact, Barany expressly teaches ligation of the probes together at column 23, lines 34-53. Thus, this argument is not correct with respect to the teaching of Barany.

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Second, Applicant extensively argues that Barany does not teach the ordered structure of the primers. As noted in the rejection itself, this is simply intended use language. The intended uses do not impose any particular sequence requirements and Barany teaches specific probes which inherently meet the structural requirements, see for example SEQ ID Nos: 1-76, any of which can be interpreted to meet the claimed requirements. As MPEP 2111.02 also notes "Intended use recitations and other types of functional language cannot be entirely disregarded. However, in apparatus, article, and composition claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art." Here, the intended use has no structural effect on the oligonucleotides. This is illustrated in the rejection, where the identical oligonucleotide may properly be composed of regions "Addressable - primer - target specific" or "primer - Addressable - target specific". Thus, the only difference between these embodiments is the functional language, and no structural difference necessarily results from this functional language as shown by the rejection.

Applicant relies upon overcoming Barany to overcome the rejection further in view of Xu and since Barany is not overcome, this rejection is maintained.

Applicant then argues that the rejection of Barany in view of Boyce-Jacino fails because Boyce-Jacino is not properly combinable with Barany. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on

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combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Further, In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, specific motivation is provided in the rejection, which notes a motivation "in order to permit amplification of the template strand within the primer in a PCR type reaction."

Applicant then argues that Boyce-Jacino does not teach the required structure. This is incorrect. What Boyce-Jacino teaches is that the primer region may also be at the 5' end of the capture region. Applicant relies upon specific preferred embodiments of Boyce-Jacino and does not look at the entirety of the teaching and in particular, the teaching expressly noted in the rejection. As MPEP 2123 notes " Disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or nonpreferred embodiments. *In re Susi*, 169 USPQ 423." Here, the disclosed example and embodiment of Boyce-Jacino that the primer region may be at the 5' end of the capture region teaches this element.

Applicant relies upon overcoming Barany in view of Boyce-Jacino to overcome the rejection further in view of Xu and since Barany in view of Boyce-Jacino is not overcome, this rejection is maintained.

***Conclusion***

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey Fredman whose telephone number is 703-308-6568. The examiner can normally be reached on 6:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Jones can be reached on 703-308-1152. The fax phone numbers for

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the organization where this application or proceeding is assigned are 703-305-3014 for regular communications and 703-305-3014 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0196.



JEFFREY FREDMAN  
~~PRIMARY EXAMINER~~  
Jeffrey Fredman  
Primary Examiner  
Art Unit 1637

April 18, 2002